

What is claimed is:

- 1 1. A machine-implemented method, comprising:
 - 2 executing a first instance of a virtual console driver that is implemented by an
 - 3 operating system kernel instance;
 - 4 establishing a first device node within a first virtual operating system environment
 - 5 (VOSE) of a plurality of VOSES controlled by the operating system kernel
 - 6 instance;
 - 7 establishing an association between the first device node and the first instance of the
 - 8 virtual console driver;
 - 9 in response to a first process' request to write to the first device node, determining
 - 10 with which instance of the virtual console driver the first device node is
 - 11 associated, wherein the first process executes in the first VOSE; and
 - 12 in response to determining that the first device node is associated with the first
 - 13 instance of the virtual console driver, sending, to the first instance of the
 - 14 virtual console driver, data received from the first process.
- 1 2. The method of claim 1, wherein, except for processes executing in the first VOSE,
2 the first device node is not accessible by any processes executing in any VOSE of the
3 plurality of VOSES.
- 1 3. The method of claim 1, wherein the first device node is exposed as “/dev/console” to
2 processes executing in the first VOSE.

1 4. The method of claim 1, further comprising:
2 establishing a second device node within a global operating system environment
3 (OSE) that comprises the plurality of VOSEs;
4 establishing an association between the second device node and the first instance of
5 the virtual console driver;
6 in response to a second process' request to read from the second device node,
7 determining with which instance of the virtual console driver the second
8 device node is associated, wherein the second process executes in the global
9 OSE; and
10 in response to determining that the second device node is associated with the first
11 instance of the virtual console driver, sending, to the second process, the data
12 that was received from the first process and sent to the first instance of the
13 virtual console driver.

1 5. The method of claim 5, wherein the second device node is not accessible by any
2 processes executing in any VOSE of the plurality of VOSES.

1 6. The method of claim 5, further comprising:
2 receiving, from the second process, a command to execute an instance of the virtual
3 console driver;
4 wherein the step of executing the first instance of the virtual console driver is
5 performed in response to receiving the command from the second process.

1 7. The method of claim 5, further comprising:
2 receiving, from the second process, a command to establish the first device node
3 within the first VOSE;

wherein the step of establishing the first device node within the first VOSE is performed in response to receiving the command from the second process.

The method of claim 1, further comprising:

executing a second instance of the virtual console driver, wherein the second instance of the virtual console driver is separate from the first instance of the virtual console driver;

establishing a second device node within a second virtual operating system environment (VOSE) of the plurality of VOSEs, wherein the second VOSE is separate from the first VOSE;

establishing an association between the second device node and the second instance of the virtual console driver;

in response to a second process' request to write to the second device node,

determining with which instance of the virtual console driver the second device node is associated, wherein the second process executes in the second VOSE; and

in response to determining that the second device node is associated with the second instance of the virtual console driver, sending, to the second instance of the virtual console driver, data received from the second process.

The method of claim 8, wherein:
except for processes executing in the first VOSE, the first device node is not
accessible by any processes executing in any VOSE of the plurality of
VOSES; and

5 except for processes executing in the second VOSE, the second device node is not
6 accessible by any processes executing in any VOSE of the plurality of
7 VOSES.

1 10. The method of claim 8, wherein:
2 the first device node is exposed as “/dev/console” to processes executing in the first
3 VOSE; and
4 the second device node is exposed as “/dev/console” to processes executing in the
5 second VOSE.

1 11. A machine-readable medium, comprising:
2 instructions for causing one or more processors to execute a first instance of a virtual
3 console driver that is implemented by an operating system kernel instance;
4 instructions for causing one or more processors to establish a first device node within
5 a first virtual operating system environment (VOSE) of a plurality of VOSEs
6 controlled by the operating system kernel instance;
7 instructions for causing one or more processors to establish an association between
8 the first device node and the first instance of the virtual console driver;
9 instructions for causing one or more processors to determine, in response to a first
10 process’ request to write to the first device node, with which instance of the
11 virtual console driver the first device node is associated, wherein the first
12 process executes in the first VOSE; and
13 instructions for causing one or more processors to send data received from the first
14 process to the first instance of the virtual console driver in response to

15 determining that the first device node is associated with the first instance of
16 the virtual console driver.

1 12. The machine-readable medium of claim 11, wherein, except for processes executing
2 in the first VOSE, the first device node is not accessible by any processes executing
3 in any VOSE of the plurality of VOSES.

1 13. The machine-readable medium of claim 11, wherein the first device node is exposed
2 as “/dev/console” to processes executing in the first VOSE.

1 14. The machine-readable medium of claim 11, further comprising:
2 instructions for causing one or more processors to establish a second device node
3 within a global operating system environment (OSE) that comprises the
4 plurality of VOSES;
5 instructions for causing one or more processors to establish an association between
6 the second device node and the first instance of the virtual console driver;
7 instructions for causing one or more processors to determine, in response to a second
8 process’ request to read from the second device node, with which instance of
9 the virtual console driver the second device node is associated, wherein the
10 second process executes in the global OSE; and
11 instructions for causing one or more processors to send, to the second process, in
12 response to determining that the second device node is associated with the
13 first instance of the virtual console driver, the data that was received from the
14 first process and sent to the first instance of the virtual console driver.

1 15. The machine-readable medium of claim 14, wherein the second device node is not
2 accessible by any processes executing in any VOSE of the plurality of VOSES.

- 1 16. The machine-readable medium of claim 14, further comprising:
 - 2 instructions for causing one or more processors to receive, from the second process, a
 - 3 command to execute an instance of the virtual console driver;
 - 4 wherein the instructions for causing one or more processors to execute the first
 - 5 instance of the virtual console driver comprise instructions for causing one or
 - 6 more processors to execute the first instance of the virtual console driver in
 - 7 response to receiving the command from the second process.
- 1 17. The machine-readable medium of claim 14, further comprising:
 - 2 instructions for causing one or more processors to receive, from the second process, a
 - 3 command to establish the first device node within the first VOSE;
 - 4 wherein the instructions for causing one or more processors to establish the first
 - 5 device node within the first VOSE comprise instructions for causing one or
 - 6 more processors to establish the first device node within the first VOSE in
 - 7 response to receiving the command from the second process.
- 1 18. The machine-readable medium of claim 11, further comprising:
 - 2 instructions for causing one or more processors to execute a second instance of the
 - 3 virtual console driver, wherein the second instance of the virtual console
 - 4 driver is separate from the first instance of the virtual console driver;
 - 5 instructions for causing one or more processors to establish a second device node
 - 6 within a second virtual operating system environment (VOSE) of the plurality
 - 7 of VOSEs, wherein the second VOSE is separate from the first VOSE;
 - 8 instructions for causing one or more processors to establish an association between
 - 9 the second device node and the second instance of the virtual console driver;

10 instructions for causing one or more processors to determine, in response to a second
11 process' request to write to the second device node, with which instance of the
12 virtual console driver the second device node is associated, wherein the
13 second process executes in the second VOSE; and
14 instructions for causing one or more processors to send data received from the second
15 process to the second instance of the virtual console driver in response to
16 determining that the second device node is associated with the second instance
17 of the virtual console driver.

- 1 19. The machine-readable medium of claim 18, wherein:
 - 2 except for processes executing in the first VOSE, the first device node is not
 - 3 accessible by any processes executing in any VOSE of the plurality of
 - 4 VOSES; and
 - 5 except for processes executing in the second VOSE, the second device node is not
 - 6 accessible by any processes executing in any VOSE of the plurality of
 - 7 VOSES.
- 1 20. The machine-readable medium of claim 18, wherein:
 - 2 the first device node is exposed as “/dev/console” to processes executing in the first
 - 3 VOSE; and
 - 4 the second device node is exposed as “/dev/console” to processes executing in the
 - 5 second VOSE.
- 1 21. An apparatus, comprising:
 - 2 a mechanism for executing a first instance of a virtual console driver that is
 - 3 implemented by an operating system kernel instance;

4 a mechanism for establishing a first device node within a first virtual operating
5 system environment (VOSE) of a plurality of VOSEs controlled by the
6 operating system kernel instance;
7 a mechanism for establishing an association between the first device node and the
8 first instance of the virtual console driver;
9 a mechanism for determining, in response to a first process' request to write to the
10 first device node, with which instance of the virtual console driver the first
11 device node is associated, wherein the first process executes in the first
12 VOSE; and
13 a mechanism for sending data received from the first process to the first instance of
14 the virtual console driver in response to determining that the first device node
15 is associated with the first instance of the virtual console driver.

1 22. The apparatus of claim 21, wherein, except for processes executing in the first VOSE,
2 the first device node is not accessible by any processes executing in any VOSE of the
3 plurality of VOSES.

1 23. The apparatus of claim 21, wherein the first device node is exposed as “/dev/console”
2 to processes executing in the first VOSE.

1 24. The apparatus of claim 21, further comprising:
2 a mechanism for establishing a second device node within a global operating system
3 environment (OSE) that comprises the plurality of VOSEs;
4 a mechanism for establishing an association between the second device node and the
5 first instance of the virtual console driver;

6 a mechanism for determining, in response to a second process' request to read from
7 the second device node, with which instance of the virtual console driver the
8 second device node is associated, wherein the second process executes in the
9 global OSE; and
10 a mechanism for sending the data that was received from the first process and sent to
11 the first instance of the virtual console driver to the second process in
12 response to determining that the second device node is associated with the
13 first instance of the virtual console driver.

1 25. The apparatus of claim 24, wherein the second device node is not accessible by any
2 processes executing in any VOSE of the plurality of VOSES.

1 26. The apparatus of claim 24, further comprising:
2 a mechanism for receiving, from the second process, a command to execute an
3 instance of the virtual console driver;
4 wherein the mechanism for executing the first instance of the virtual console driver
5 comprises a mechanism for executing the first instance of the virtual console
6 driver in response to receiving the command from the second process.

1 27. The apparatus of claim 24, further comprising:
2 a mechanism for receiving, from the second process, a command to establish the first
3 device node within the first VOSE;
4 wherein the mechanism for establishing the first device node within the first VOSE
5 comprises a mechanism for establishing the first device node within the first
6 VOSE in response to receiving the command from the second process.

1 28. The apparatus of claim 21, further comprising:

2 a mechanism for executing a second instance of the virtual console driver, wherein
3 the second instance of the virtual console driver is separate from the first
4 instance of the virtual console driver;
5 a mechanism for establishing a second device node within a second virtual operating
6 system environment (VOSE) of the plurality of VOSEs, wherein the second
7 VOSE is separate from the first VOSE;
8 a mechanism for establishing an association between the second device node and the
9 second instance of the virtual console driver;
10 a mechanism for determining, in response to a second process' request to write to the
11 second device node, with which instance of the virtual console driver the
12 second device node is associated, wherein the second process executes in the
13 second VOSE; and
14 a mechanism for sending data received from the second process to the second
15 instance of the virtual console driver in response to determining that the
16 second device node is associated with the second instance of the virtual
17 console driver.

1 29. The apparatus of claim 28, wherein:
2 except for processes executing in the first VOSE, the first device node is not
3 accessible by any processes executing in any VOSE of the plurality of
4 VOSES; and
5 except for processes executing in the second VOSE, the second device node is not
6 accessible by any processes executing in any VOSE of the plurality of
7 VOSES.

- 1 30. The apparatus of claim 28, wherein:
 - 2 the first device node is exposed as “/dev/console” to processes executing in the first
 - 3 VOSE; and
 - 4 the second device node is exposed as “/dev/console” to processes executing in the
 - 5 second VOSE.